WIRE
& WIRE PRODUCTS

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"The quality die"

Our experts will solve your die problems!

Balloffet Diamond Wire Dies Co., Inc.

342 Madison Avenue, New York City

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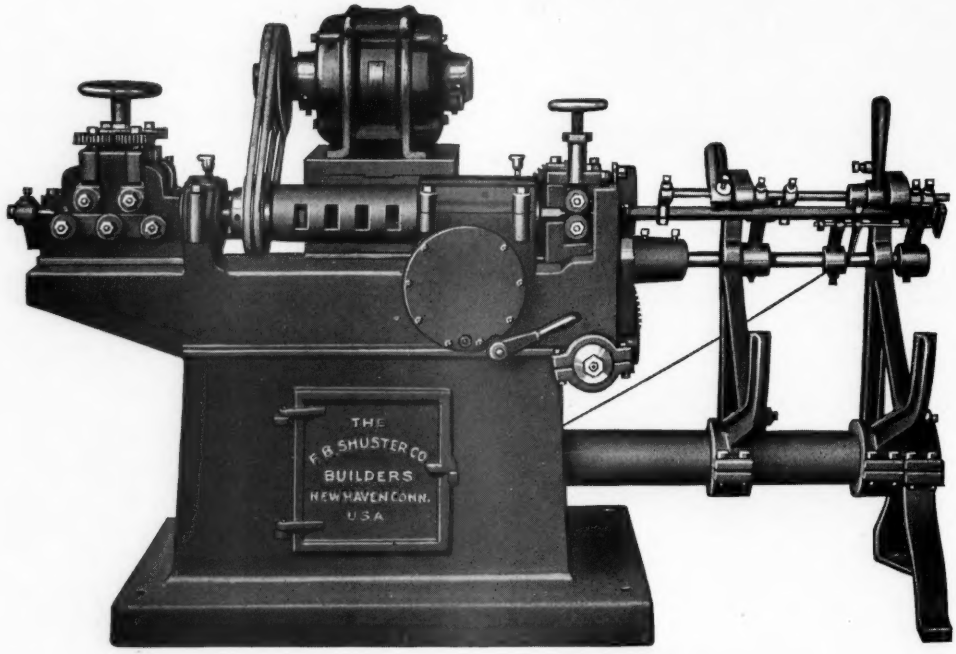
September 1929

SHUSTER

Automatic Wire Straightening and Cutting Machinery



THIS self contained motor driven Machine is operated by one motor, and it is equipped with five breaking rolls which rough straighten the wire before it enters the flier. A valuable feature on certain tempers of wire, and one which increases the production.

May be furnished with, or without, this attachment.

The rotary flier is of steel and mounted in Timken Roller Bearings, and all bearings throughout the machine are bronze bushed.

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The F. B. Shuster Co. **New Haven, Conn.**

STRAIGHTENER SPECIALISTS SINCE 1866

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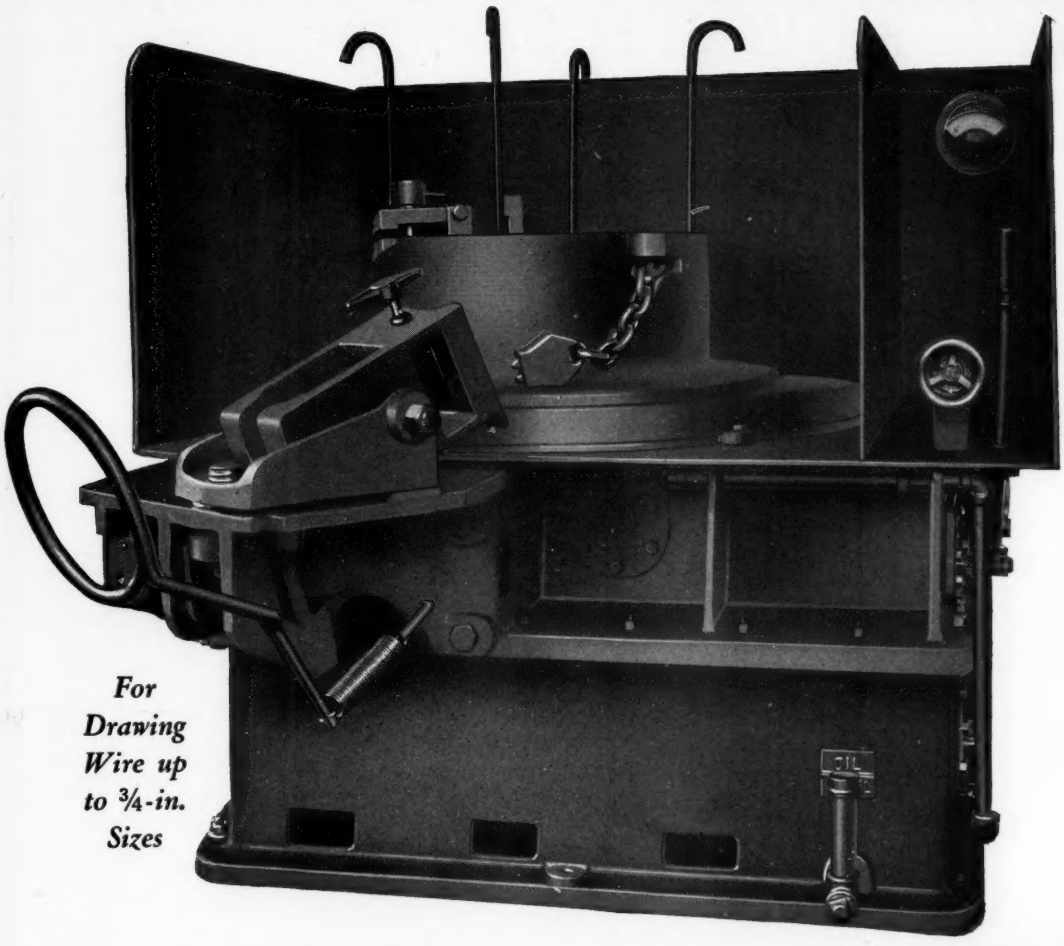
VAUGHN (LARGE SIZE) MOTOBLOCS



For Drawing Wire up to ¾-in. Sizes

WHETHER your production is altogether or only occasionally in these large sizes, the Motobloc presents real advantages worthy of your serious consideration.

Powerful and fast for drawing ¾-inch wire, it is equally efficient for drawing smaller sizes. This means that there are no idle periods.

It is this unique ability to run a large number of sizes that makes the Vaughn Motobloc a 100% producer.

Furthermore, the excellent mechanical construction employed in the Motobloc results in unusual smoothness, cleanliness and low maintenance costs.

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HEAVY — ALL NINE
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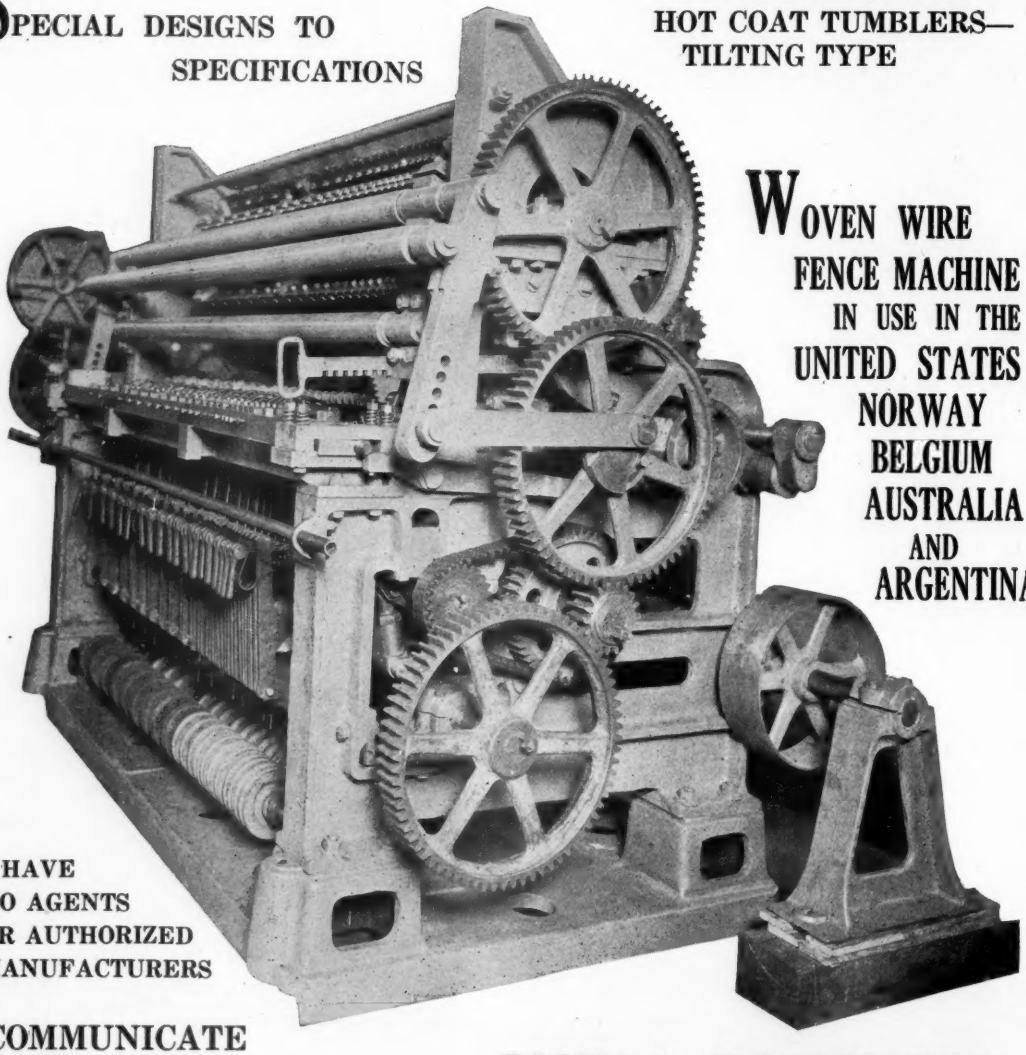

WOVEN WIRE FENCE MACHINE IN USE IN THE UNITED STATES NORWAY BELGIUM AUSTRALIA AND ARGENTINA

I HAVE NO AGENTS OR AUTHORIZED MANUFACTURERS

COMMUNICATE DIRECTLY

JOHN A. HOLMQUIST
ALIQUIPPA, PENNSYLVANIA

THE Census Bureau has a tremendous task before it next year when its enumerators begin to take counts, not only of population, but of manufactures, agriculture, mining and distribution.

Business and industry will for the first time obtain the kind of census data of most practical value in the study of markets through the appointment of an Advisory Committee on Manufactures by Secretary of Commerce Lamont under the chairmanship of Col. L. S. Horner, President, Niles-Bement-Pond Company.

* * *

One of the tasks of the Committe will be to determine the questions to be asked in the forthcoming Census of Manufactures, limiting the questions to those of practical value to manufacturers. It will also determine what tabulations are to be made subsequently with a view to their potential value to the manufacturer.

At the first meeting of the Committee it was decided to recommend a complete census, one covering all manufacturing plants regardless of size. The smaller plants will be covered by the population enumerators. Larger ones will be approached direct by the Division of Manufactures of the Census Bureau.

The Committee also approved the policy of the Census Bureau in conferring with industrial organizations and with representative members of each industry in formulating schedules especially adapted to the industry in question.

* * *

It is obvious that the value of the undertaking will largely depend upon the cooperation of manufacturers in making reports to the Census Bureau. This preliminary statement of its aims is necessarily phrased in general terms that will be followed by more specific details as the work of the Committee progresses. *The Publishers*

WIRE & WIRE PRODUCTS

A monthly publication devoted to wire drawing and wire forming

Vol. 4 September, 1929 No. 9

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Executive and Editorial Offices:
551 Fifth Avenue, New York City. Telephone: Murray Hill 10191

Publication Office: Washington, N. J.

Issued Monthly
50 Cents a Copy

Annual Subscription, U. S., and Canada $5.00
Foreign, $7.50

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UN-WIDIA ALLOY DIES

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Specialization makes for progress
We make dies exclusively

Un-Widia Alloy Dies are the result of the collaboration of the world's best known makers of special alloys, Fried Krupp Co., and America's largest wire and tube die manufacturers, the Union Wire Die Corporation, who have the exclusive right to sell Widia metal, for drawing purposes only, in the United States, Canada, Mexico and France.

Lower Labor Costs

Considering the enormous production obtainable on Un-Widia alloy dies, the labor savings are obvious, especially on continuous wire drawing machines.

Lower die costs per unit of material drawn are guaranteed.

Reduced rejections add to profits.

THE KRUPP PRODUCT
Widia metal is made into dies
and sold exclusively in the
UNITED STATES, CANADA and FRANCE
BY

UNION WIRE DIE CORPORATION

NEW YORK

WIRE & WIRE PRODUCTS

Vol. 4 · SEPTEMBER, 1929 No. 9

Report of Standardization Projects Covers Numerous Wire Items

Bare and covered wires, gages and miscellaneous wire products are among projects completed or under way

IMPORTANT developments in the national standardization activities of almost every American industry are described in the American Standards Year Book, a review of the national industrial standardization movement during the past twelve months, published recently by the American Standards Association, 29 West 39th Street, New York City.

The Year Book lists altogether about 150 national standards which have already been completed and about 175 other national projects now under way. There are listed below a selection of projects of particular interest to wire manufacturers and wire formers taken from a compilation of all the projects that up to May 15 of this year had an official status before the A. S. A., including standards already approved.

In the first column are shown the A. S. A. symbols used to designate the projects. When the standard is approved, the year of approval is suffixed, giving the final official symbol by which the published standard is identified and listed. The numbers in the last column indicate the stage of development reached by the project in accordance with the following scheme:

	Status
Decision to undertake standardization	1
Standardization work under way	2
Draft in office of A. S. A.	3
Submitted for formal approval	4
Approved by A. S. A.	5
Published	6

A charge is made for items marked with an asterisk (*)

Symbol	**Wires and Cables**	Status
Cba	Wire and Cable, Nomenclature and Methods of Test	4
C8b1—1929	Tinned Soft or Annealed Copper Wire for Rubber Insulation (*)	6
C8b2—1928	Soft or Annealed Copper Wire, Specifications for (*)	6
C8c	Stranding Table for Insulated Wires and Cables	2
C8d1—1928	30% Rubber Insulation for Wire and Cable for General Purposes, Specifications for (*)	6
C8d2	Code Rubber Insulation, Specifications for	3
C8e	Standard Make-ups for Rubber Insulated Wires	2
C8f	Impregnated Paper Cable, Specifications for	2
C8g	Varnished Cloth Cable, Specifications for	2
C8h	Fibrous Covered Cable, Specifications for	2
C8i	Metallic Coverings for Insulated Wires and Cables, Specifications for	2
C8j1—1928	Cotton Covered Round Copper Magnet Wire, Specifications for (*)	6
C8j2—1928	Silk Covered Round Copper Magnet Wire, Specifications for (*)	6
C8j3—1928	Enameled Round Copper Magnet Wire, Specifications for (*)	6
C8k	Weatherproof, Heat Resisting and Similar Wires, Specifications for	2
C11—1927	Hard Drawn Aluminum Conductors, Electrical Constants for (*)	9
	Mechanical Engineering	
Bla-1924	Screw Threads for Bolts, Machine Screws, Nuts and Commercially Tapped Holes (*)	6

B1b Screw Thread Gages and Gaging of Screw Threads 2
B2a Screw Threads for Rigid Electrical Conduits 2

Bolt, Nut and Rivet Proportions

(Standardization of dimensions, material and nomenclature of rivets, hexagonal and square head bolts and machine screws; but not including the standardization of screw threads.)
B18a—1927 Small Rivets (*) 6
B18b—1927 Wrench head Bolts and Nuts and Wrench Openings, Dimensions of (*) 6
B18b1 Stud and Stud Bolt Dimensions 2
B18c Slotted Head Machine Screws and Wood Screw Heads 3
B18d Track Bolts and Nuts 3
B18e—1928 Round Unslotted Head Bolts, Dimensions of (*) 6
B18f—1928 Plow Bolts, Dimensions of (*) 6
B18g—1929 Tinners, Coopers and Belt Rivets (*) 6
B18h Large Rivets 3
B18i Socket Head Cap Screws 2

Gages

B32 Wire and Sheet Metal Gages 2
(The standardization of a method of designating the diameter of metal and metal alloy wire, the thickness of metals in sheet, plate and strip form and wall thickness of tubing, piping and casing made of these materials; and the establishment of a standard series, or standard series, of nominal sizes and of tolerances for wires, sheets, plates and strips.)

Electrical Engineering

C1 Electric Wiring and Apparatus in Relation to Fire Hazard 4
C2—1927 National Electric formally approved by the American Standards Association following the preparation of the Safety Code (*) 6
(Protective grounding of circuits and equipments; installation of machinery, switch boards, etc., in generating stations and sub stations; installation and maintenance of electrical wiring and utilization apparatus, and of supply and signal lines, both overhead and underground, and the operation of electric lines and equipment—all from the point of view of casualty hazards.)

Radio

C16b Component Parts and Wiring 2

Non-Ferrous Metallurgy

H4—1928 Soft or Annealed Copper Wire, Specifications for (*) 6
H8—1925 Free-Cutting Brass Rod for Use in Screw Machines, Specifications for 6
H14—1929 Hard-Drawn Copper Wire, Specifications for (*) 6
H15 Medium Hard Drawn Copper Wire, Specifications for 4
H16 Tinned Soft or Annealed Copper Wire for Rubber Insulation, Specifications for (*) 6
H17 Lake Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars, Specifications for 4
H18 Electrolytic Copper Wire Bars, Cakes, Slabs, Billets, Ingots and Ingot Bars, Specifications for 4

Mining

M11—1927 Wire Ropes for Mines, Specifications for and Recommended Practice in the Use of (*) 6

British Issue New Standard Wire Rope Specifications

IN continuation of the program of work in its wire rope section, the British Engineering Standards Association, the official organization in England corresponding to the U. S. Bureau of Standards, has just issued British standard specifications for steel wire ropes for oil wells and for shipping purposes. The shipping rope specification has been prepared with the object of unifying the requirements as to tensile breaking strength of the various authorities in regard to shipping wire ropes with the object of cheapening production. The figures specified are a compromise of the differing figures specified by Lloyd's Register of Shipping, the Bureau Veritas International Registry of Shipping and the British Corporation Registry of Shipping and Aircraft. It is confidently expected that the adoption of the requirements of the specification will simplify the demands of the shipping industry and so lead to a considerable reduction in the cost of the wire ropes used.

The oil well rope specification contains clauses regulating the testing carried out in connection with the purchase of oil well ropes, and includes, tensile, torsion, and bending tests. A foreword is also included containing recommendations for the guidance of designers and users to assist them in obtaining reasonable endurance in service of wire ropes of the types and kind covered by the specification. The recommendations deal with lubrication, drums, sheaves, socketing, etc., and it is hoped that they will be of considerable assistance to all users of this class of rope. The Wire Ropes Committee of the Association is also dealing with the more difficult problem of flattened strand ropes, and it is hoped that specifications will be available later for both winding and haulage ropes of flattened strand construction.

Wire Cloth For Paper Making

An important industrial consumer provides an active market for copper and bronze woven wire

By William Beebe

THE consumption of wire cloth by the eight hundred paper mills in this country with their two thousand machines will aggregate some eleven million square feet of woven cloth per annum. The greater quantity is used on a paper making machine known as Fourdrinier, named for an Englishman who improved an earlier French invention.

In the course of recent hearings on the tariff before the Ways and Means committee of the House of Representatives, some other interesting facts about the status of the industry in the United States came to light. Woven wire cloth has been made in this country for about sixty years. There are about twenty five companies now engaged in the manufacture of it. Their capital investment is approximately $15,000,000, and they employ from 1500 to 2000 people. The value of their combined annual output approximates $7,000,000.

Sizes Not Standardized

The endless woven wire mat used on a Fourdrinier machine is known in paper making circles as a "wire". It is woven to suit the individual requirements and is not as yet supplied in recognized standard sizes. Widths vary from 45 to 300 inches and lengths from fifty to eighty feet. Brass and bronze are the materials used—the low brass being an alloy of about 85% copper and 15% zinc, and the bronze an alloy of about 90% copper, 8% tin and the balance phosphorous.

The endless effect is obtained by either a stitched or soldered seam. In a stitched seam each end of the cloth is sewed with phosphor bronze wire, then brought together and laced with

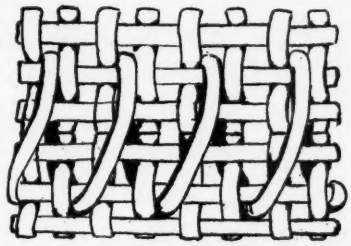


Fig. 1. Enlarged view of a soldered seam showing wire with which the seam is sewn. The final sewing wire catches only the last weft wire instead of the second last.

the same material. In soldering, the end shute wire of each end of the cloth is soldered to the warp wires, then the two ends of the cloth are brought together and sewed with phosphor bronze wire. The operation, of course, requires skill and care so as not to fill up the mesh with solder.

Level Seams Important

The seam must be level with the rest of the wire, smooth on both sides, and very closely approximate the mesh of the wire. It must be close enough to sustain the wet pulp without permitting it to pass through, and coarse enough to drain off the water.

The selvages at the sides of the finished wire are reinforced with silk threads running in the direction of the warp. The number and color of the threads also enable the manufacturer to identify his product.

Although the world's finest wire cloth has been made in this country—a sieve cloth having 400 parallel wires per inch of width in each direction—the sizes more commonly used in paper making are as follows:

Meshes per sq. in.	Guage of Warp Wire
14 x 14	.021
24 x 24	.015
35 x 35	.012
40 x 40	.011
50 x 45	.010
60 x 48	.009
65 x 50	.008
70 x 52	.008
75 x 56	.007
80 x 64	.006

The 60-mesh wire will run about three and a third square feet to the pound, the 65-mesh about three and three eighths square feet to the pound, and the 70-mesh three and one half square feet to the pound.

The relative merit of brass and bronze wires depends on the conditions surrounding their use. Bronze is harder and more durable, is not easily affected by friction or acids, and withstands the vibration and wear and tear of high speed machines. However, it lacks the flexibility and stretch of the low brass wire which make the latter more adaptable to bending around rolls and running over tubes. On modern machines the wire travels at rates varying from 75 to 1000 feet per minute.

Friction Causes Wear

The wire on the machine carries the wet pulp on its surface and is supported by rollers placed closely together to support the weight. In the course of its progress through the machine the pulp is subjected to vacuum

(*Please turn to page 317*)

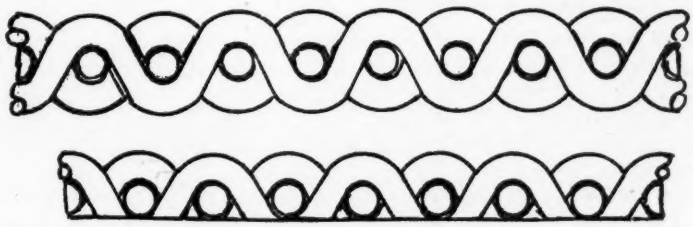


Fig. 2. A Fourdrinier wire wears almost entirely on the lower side, due to friction from the suction boxes. This enlarged sketch of a cross-section shows the wire when new and when worn to the cracking point.

Some Practical Suggestions In Reference to Coil Springs

A knowledge of materials, sizes and specifications will enable the user to get the best results from the spring manufacturer

By E. W. Stewart

Sales Manager, The Wm. D. Gibson Company, Chicago

Part II—Conclusion

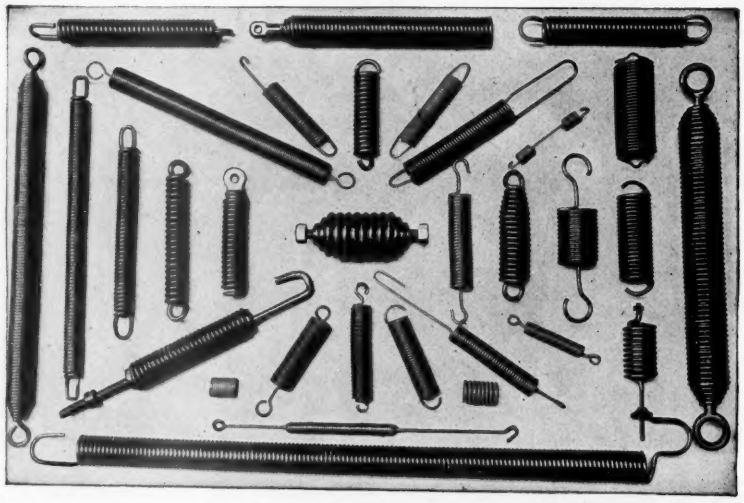
TO repeat the concluding suggestion in the first half of this paper, wherever a spring is an important member of any mechanism, it should be carefully considered in the original design of all other parts, an efficient spring obtained first, and the dimensions of other parts arranged to provide the spring space necessary.

The wire size and number of coils cannot well be considered separately, as each depends upon the other. For a given outside diameter and length, several combinations of gauge and coils might be possible to meet a given load rate.

For any application where a compression spring is used under conditions in which rapidity of action is not a factor, it is good practice to use the heaviest wire size and greatest number of coils possible within the limits permissible for outside and inside diameters and closed length. This practice results in springs operating at low stresses within the wire, which condition is conductive to long life. It is also true as a rule, that such springs can be satisfactorily made of commercial carbon wires while highly stressed springs call for special steels with high physical properties.

High Speed Problems

When springs are required to operate at high speed, as in automobile engine valves, special considerations enter into each problem. In such cases the most expert engineers in the spring industry should be consulted, as even they still have much to learn about the peculiar inertia forces operating within springs at high speeds.



An assortment of extension springs formed from round wire and representing various types of hook and loop end finishes. Springs that must have special safeguards against breakage may have ends formed of separate pieces of wire over which the end coils are tapered. These are known as "Swivel hooks or loops".

The same is true of springs operating at unusual temperatures, either extremely high or extremely low. Here a knowledge of the best available materials is essential, and for excessively high temperatures nothing has yet been developed which can be depended upon for any great length of time as a spring.

Formula Determines Wire Size

The general mathematical relations which govern the design of springs control the size of wire within certain definite limits for any given load. There is a somewhat general impression that the stiffness of a spring can be varied, depending upon whether its temper is hard or soft. This, however, is not true. The amount of deflection a spring will stand before becoming permanently altered in its form, or "taking a permanent set", depends upon hardness within certain limits; but if two springs of identical dimensions, one hard and the other relatively soft, are tested, it will be found that both carry the same load for any distance of compression, up to the point where the softer spring "takes a set." This is the point at which the material in the softer spring reaches its elastic limit, and "yields".

In general, compression springs vary in load rate, or scale per inch, inversely as the number of active coils. For instance, if a spring containing 10 active coils were to compress 1″ under 100 lbs. a spring of 20 active coils with all other dimensions remaining the same would compress 1″ with 50 lbs., or 2″ with the 100 lb. load. This consideration in which coils of a compression spring are active

often leads to confusion, and depends upon the manner in which the end coils of the spring are finished.

In the simplest form, which is a spring with "plain ends", or "open ends not ground", all coils are active and the solid length is equal to the wire thickness multiplied by the total number of coils *plus one*. If the ends are "plain ends ground," or otherwise called "open ends ground", about half the thickness of wire is ground off at each end which results in a flat surface on each end for about half a coil. Consequently, this half coil at each end is not active, the number of active coils being about one less than the total, and the solid length about equal to the wire thickness times the total number of coils, while with "squared ends", or "closed ends not ground", the number of coils which are active is two less than the total, and the solid length is the wire thickness times the total number of coils *plus* one, as there is one more thickness of wire than the number of coils.

Ground Ends

If the ends are "squared and ground", or "closed ends ground", this extra thickness of wire is ground away and the solid height approximates the wire size times the total number of coils; but the number of coils which are active is the total number less two. The manner of finishing the ends of compression springs has a considerable bearing on their cost of manufacture, and this is particularly true if the ends are ground. Special attention to squareness always increases costs, as a spring cannot be ground perfectly like a solid rod or a tube, because of the elasticity of the end coils against a grinding wheel.

Tapered Ends

Heavy springs, of materials larger than 7/16″ or ½″ wire, are usually made hot from bars. They are subject to all the conditions pertaining to wire springs, but as a rule the ends are not ground. To avoid the expense of grinding away so much material, the bars are usually cut to the length required and the ends tapered. This tapered end, when coiled, has the same effect of forming an approximately square end as is produced by grinding in a lighter spring of wire.

Extension Springs

Extension springs have all of the general characteristics of compression springs, except that an outside force is applied to elongate the spring instead of to shorten it. They are usually, but not always, close coiled. Two dimensions, or variations of two, are required to determine their length:— one the length of the coiled portion or body, the other a length determining the dimensions of hooks or loops at the ends.

Any number of possible variations of hook and loop forms can be made, and the form generally depends on means of attachment to other parts. The most commonly used and least costly style is made by shaping the end coils into a hook or loop the same diameter as the coil, and usually described as a "regular machine loop." Any other form can safely be specified only by sample or a detailed sketch.

Property of Initial Tension

The principal feature in which extension springs differ from compression springs is in the use of what is commonly called "initial tension." This term refers to a condition produced by coiling springs with a twist in the wire, because of which the finished spring has a pressure between adjacent coils. Some load is required to overcome this pressure, before the coils actually begin to separate. This load is the initial tension, and varies with the size of the wire and diameter of coil, but is usually a load equivalent to ten thousand to fifteen thousand pounds per square inch torsional stress in the wire.

The use of this property of extension springs is often valuable in saving length, as otherwise the load represented by the initial tension could be built up only by a certain amount of stretch. Extension springs in which the load for the first unit of extension must be equal to that for each additional unit of extension, must be made without initial tension. This would apply to springs for scales and similar purposes.

Another difference is that a compression spring is limited in travel, as it will close solid, while an extension spring can be stretched beyond the load it will safely carry causing permanent set. In using springs of this type provision should be made to prevent such injury, and specifications should state the maximum stretch required in order that we may be sure the requirements will be met.

Torsion Springs

Torsion springs are of such a special nature and their applications so varied that they can only be satisfactorily covered by drawings. A few precautions as to specifications, however, may be of assistance. For instance, it is important that any load specification for a torsion spring be given in terms of pound-inches, or a definite load at a *definite radius from the center*, as torque is a resultant of a force and a lever. If torsion springs are close coiled, room must always be provided lengthwise for an elongation of the spring of one thickness of wire for each complete revolution it is wound up. Provision must also be made for the reduction in diameter as it is wound up, to prevent the diameter reducing sufficiently to bind on the shaft or rod on which the spring is mounted.

Direction of Load

Lastly, it is always imperative that a torsion spring be loaded in a direction which causes the diameter of the coils to reduce, therefore it is necessary to know whether it is to be loaded in a right hand or "clock-wise" direction, or left hand or "counter clock-wise".

Patent Decisions Affect Wire Formers

Coil bed springs, wire-drawing mechanism, and a process for heat treating cable covering figure in recent decisions

The Simmons Company, Plaintiff, v. The Champion Spring Company. Equity No. 2319, District Court for the Northern District of Ohio.

PATENT No. 1432499 for a bed spring having a mechanism designed to prevent sideway of the coil springs and maintain the upper and lower bed spring frames in alignment, was held valid and infringed. Although the patent was a secondary or improvement patent, it was held, infringement is found where defendant's device in performance and function is substantially the same, even though it be distinguishable in design.

The suit was for infringement of Travis patent No. 1432499, issued October 17, 1922. There was denial of invention and infringement. The court concluded, in part,

"Although the patent in suit may well be classed as a secondary patent and should thus be narrowly construed with respect to the range of equivalents to which it is entitled, nevertheless, where identity of function and performance are present in a subsequent device or structure, infringement will be found. The function and performance of defendant's device are substantially the same as the plaintiffs'. The defendant's structure is distinguishable in design, but it is the substantial embodiment of Travis' invention. Some different features in the defendant's springs may be thought to be improvements over Travis', but do not avoid infringement."

Ex parte Philip V. Tippet, Appeal No. 1567, Board of Appeals of the Patent Office.

Patent No. 1723316 was issued August 6, 1929, to Philip V. Tippet for wire-drawing mechanism, on application No. 705223, filed April 9, 1924.

The rejection of claims 1 to 4, based on the ground of lack of invention over patents to Saville and Lamb, the former showing a housing though not an oil-tight casing for the gearing, was affirmed on the ground that there would be no invention in closing the open housing of Saville so as to form an oil-tight casing in view of the common practice in automobile construction.

Applicant's contention that the patent to Lamb does not show "a self-contained unit" in the sense used by applicant was overruled for the reason that any one of the successive number of dies and rolls would satisfy the terms of the claims and all but one unit could be eliminated without invention.

The appealed claims stand rejected on the patents to Saville and Lamb.

Appellant contends that Saville does not disclose a transverse power-driven shaft journaled in said housing, nor "the walls of said housing forming an oil-tight casing for said gearing," as specified in each of the appealed claims.

Saville shows his transverse power-driven shaft b' journaled in the motor frame which is mounted in the housing. We do not think the claims clearly distinguish in this feature.

In our opinion there would be no invention in closing the open housing of Saville so as to form an oil-tight casing for the gearing in view of the fact that this is such a common practice in automobile construction as to make the citation of a reference therefor unnecessary.

The patent to Lamb shows the above mentioned features but appellant contends that Lamb does not show "a self-contained unit" in the sense used by appellant. While it is true that Lamb shows a successive number of dies and rolls, we think that any one of them may be properly designated "a self-contained unit" and that there would be no invention in eliminating all but one of the units of Lamb's device.

Invention Not Found

Claim 4 further recites: "said housing being arranged and constructed so as to permit the removal therefrom of said spindle along with the gear thereon."

We agree with the examiner that this statement is purely functional, that it does not distinguish from Lamb and that in view of the latter patent there would be no invention in modifying the housing of Saville to permit the removal of the spindle and gear therefrom.

We have carefully considered appellant's brief and the affidavits of record without discovering any reversible error in the examiner's holdings. In our opinion the numerous claims allowed by the examiner protect appellant's invention as broadly as the art of record will permit.

The decision of the examiner is affirmed.

Ex parte Gustaf W. Elmen. Appeal No. 1357, Board of Appeals of the Patent Office.

Patent No. 1722079 was issued July 23, 1929, to Gustaf W. Elmen for Heat Treating Metallic Conductors, on application No. 602,287, filed November 20, 1922.

In holding that an apparatus for heat treating a conductor, depending for its novelty upon the feature of maintaining the entrance portion of a furnace at a temperature somewhat above

(*Please turn to page 320*)

Rod Mill Electrification in the South

Synchronous motor drives and unusual motor combination used by Gulf States Steel Company

By Gordon Fox

Electrical Engineer, Freyn Engineering Company

A considerable part of the steel tonnage produced by the Gulf States Steel Company is marketed in the form of wire products. Open hearth ingots, 18 in. x 20 in., weighing 5,400 lb., are reduced in a 36-in., blooming mill, engine driven, to 4 in. x 4 in. billet. These billets supply the rod mill, which in turn, delivers to the wire mills. About 80 per cent of the output of the rod mill is No. 5 rod.

The rod mill is of the Garrett type. Six 16-in. tandem roughing passes, of which the last four are continuous, are followed by twelve 12-in. strand and finishing passes arranged in a staggered train as shown in the accompanying diagram, Fig. 1.

This mill was previously driven by three steam engines. One engine was directly connected to the lay shaft of the continuous roughing stands, another engine drove stands 7 to 16 inclusive, through a series of rope drives, while a third engine drove finishing stands 17 and 18. The steam for these engines was supplied at 150 lb. pressure by coal-fired boilers. The engines exhausted at about atmospheric pressure into a low-pressure line common to this mill and to the steam-driven blooming mill. Much of the low-pressure steam from these mill drives was utilized in low-pressure turbines located in a common building with the rod mill engines.

A study of the power, fuel and water supply for this plant indicated that substantial economies could be derived through electrification of the steam-driven mills, coupled with centralized generation of electric power in a new power plant located near the blast furnace plant. The connection with the Alabama Power Company was maintained for the purchase of power that is required in addition to that generated in the new power house.

The electrification of the rod mill is of interest, first, because it involves the use of five synchronous motors in a system of subdivided or group drives. It is a pioneer application of this type. It is of interest, secondarily, because of the combination of one of the driving motors with a direct-current generator to make up a motor-generator set which, in turn, supplies the direct-current motor driving the finishing stands. The size and arrangement of the driving motors is shown in the diagram. Rather high-speed motors with gear drives are employed for the continuous group, for stand

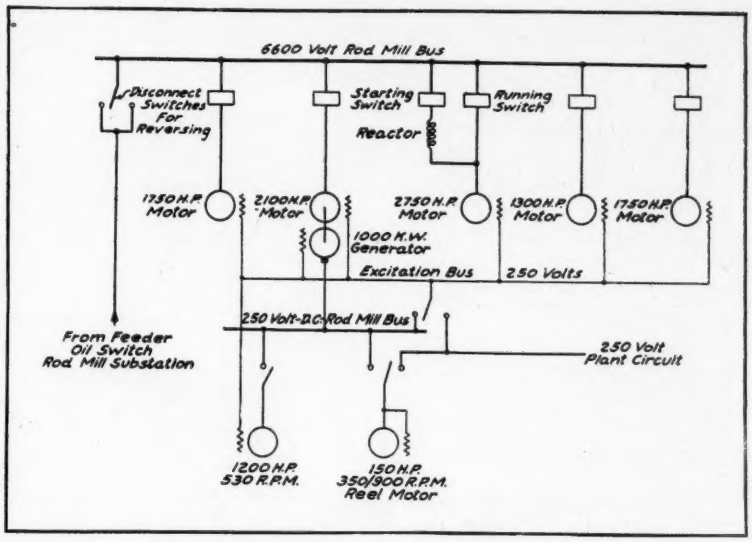


Fig. 2. Single line wiring diagram of Rod Mill main drives

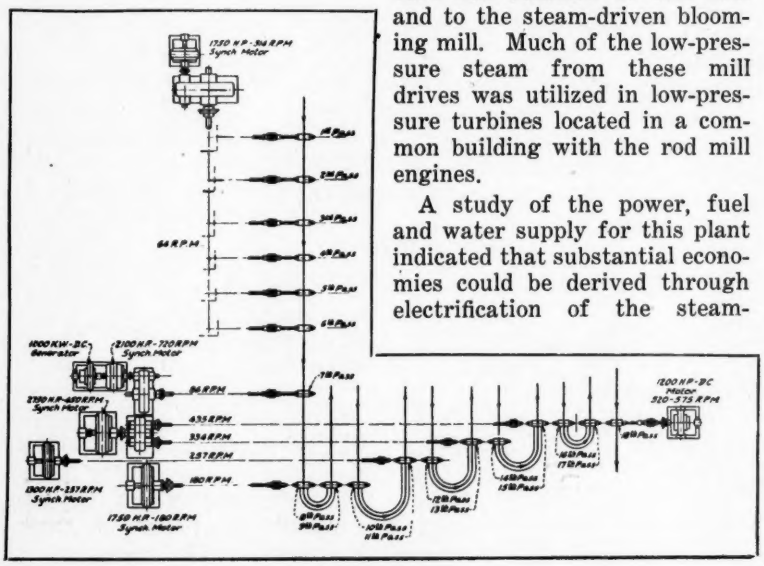


Fig. 1. Layout of Rod Mill

7 and for the group comprising stands 13, 14, 15 and 16. The gear set for the latter group is a special design enabling one motor to drive two parallel shafts. The motors driving groups made up of stands 8, 9, 10 and 11, 12, are direct coupled.

A motor of about 700-hp. capacity is required at 7 stand. The required pinion speed, 86 r. p. m., permits the use of a geared motor at 720 r.p.m. This is a favorable speed for a motor-generator set. As such a set, or its equivalent, is required to supply direct current to the adjustable-speed motor driving finishing stands 17 and 18, economy in first cost, as well as a slight gain in efficiency, dictated the combination indicated wherein a 1,000-kw. generator is coupled to the motor driving stand 7, the motor size for this drive being increased to a total of 2,100 hp.

The arrangement for starting and switching the synchronous motors is of interest. All of these motors, with the exception of the 2,750-hp. unit, are arranged to start on full voltage; developing approximately full-load torque with three to four times full-load kva. The pull-in torque developed by these motors is about half of full-load value. The 2,750-hp. motor is arranged to start normally with a reactor in series, to minimize the usual starting inrush. However, if the starting torque, under reduced voltage, should be deficient, as on a Monday morning, full voltage can be applied with no ill effects other than the high starting in-rush.

As these motors run almost entirely in one direction, the ability to back off being seldom required, it was not thought necessary to supply forward and reverse oil circuit breakers for the motors individually. Each motor is provided with a single breaker. A set of reversing disconnects is provided ahead of the bus supplying the entire group of synchronous motors.

The synchronous motors are all wound for 6,600 volts, 3 phase, 60 cycles. The 1,000-kw., direct-current generator and the 1,200-hp. motor driving stands 17 and 18, are wound for 250 volts. The excitation for the synchronous motors can be taken either from the 250-volt, direct-current plant system or from the 1,000-kw. generator. Likewise the motor driving the reel group, a 150-hp., 350/900-r.p.m., 250-volt, direct-current, adjustable-speed motor, may be supplied from either of these sources.

This rod mill is provided with seven reels. Finishing at about 1,600-ft. per min., six strands are closely maintained, resulting in an average output of about 350 tons per 12-hr. turn. The power consumption of the main roll drives, electrically driven, is about 200 kw.-hr. per gross ton of product. This compares with a consumption of about 13,000 lb. of steam per hour used by the engines which formerly drove the mill. The reduction in operating and maintenance labor also represents a marked economy.

Westinghouse Develops New Substitute for Platinum Filaments

DEVELOPMENT of a new metal known as "Konel", which is credited with being much stronger than other metals at high temperatures has been announced by officials of the Westinghouse Electric and Manufacturing Company. The announcement followed the granting of foreign patent rights. Originally developed by the Westinghouse Research Laboratories as a substitute for platinum in the manufacture of filaments for radio tubes, the new metal was discovered to be harder to forge than steel, and to be very tough at high temperatures, when most metals lose their strength. Engineers predict many uses for Konel.

The new metal was created by Dr. E. F. Lowry, a graduate of Ohio State University. As a substitute for platinum, Westinghouse officials are authority for the statement that Konel already is saving approximately $250,000 monthly in the manufacture of radio tubes. Platinum costs approximately $180 per ounce, while the new substance costs only a few dollars a pound. Life of Konel filaments is approximately ten times longer than other filaments. Tubes with filaments made of the new metal are operated 175 degrees colder than tubes with platinum filaments but with the same emission, thereby giving better reception results.

Welding Rod in a New Setting

NOT just because he had run out of round stock, but because it was a handy and workable form of the metal, a clever welder foreman in a west coast machine shop designed and fabricated the micrometer in Fig. 1 from pieces of welding rod.

The main members were made from ¼-in. chromemolybdenum welding rod and the cross members were of 3/16-in. High Test welding rod. The end pieces into which are set the delicate measuring mechanism, were made from pieces ¼-in. by 1-in. strap steel.

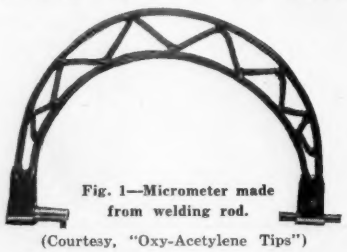


Fig. 1—Micrometer made from welding rod.

(Courtesy, "Oxy-Acetylene Tips")

All joints were made by oxy-acetylene welding. The micrometer has a depth of 5½-in. and the jaws have a large enough spread so that they can accommodate pieces of thicknesses up to 11 inches.

Nickel Clad Steel Eliminates Costly Pot Failures

New containers for hot lead and chemicals follow long search to replace unsatisfactory alloys

By G. R. Greenslade, M. S., M. A., Ph. D.

*Chief Physicist, Flannery Manufacturing Company, Pittsburgh, Pa.**

NO container for lead, salt, cyanide or caustic baths has heretofore been able to resist indefinitely the destructive forces which are encountered in high temperature duty. Pots and boxes of many and varied composition have been tried by manufacturers and heat treaters without successful result. Constant watch has been maintained for a pot that will eliminate the worry and delay of frequent pot failures.

As a result of much research a patented, heat-enduring container finally has been developed, which because of its construction is known as Niclad.

The Niclad pot consists of a low carbon steel or iron ingot form, drawn from solid sheet. The outside is clad with nickel by metallic arc welding. This combination furnishes qualities which have not been obtained in the past.

Severe Service Record

The steel on the inside of the pot which comes in contact with salt mixtures, cyanide, or lead, as the case may be, is capable of resisting the chemical and metallurgical action of the bath. The nickel cladding on the outside resists the action of air and combustion gases at high temperatures. Under severe service, where alloy pots have averaged 1000 hours, Niclad pots have lasted over 7000 hours.

Various combinations of metals are used in manufacturing Niclad pots and boxes suitable for different operating conditions, but, for majority of purposes, iron covered with nickel is the most serviceable. These

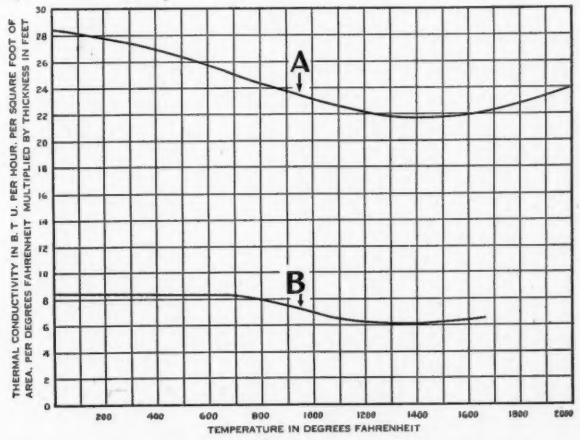
An inner surface of steel resists corrosive action in the new pot and a non-oxidizing outer coat of nickel affords protection against hot furnace gases. The combination of these two metals affords greater strength with thinner walls and high thermal conductivity.

two metals are admirably suited for joining, by the Niclad process, since their coefficients of thermal expansion are nearly the same. There is no tendency to force the two metals apart when they are heated to high temperatures. It may be noted that at 1650° F., the total difference in the expansion of the two metals is only 0.0008, that is to say, the relative change of length of the inner and outer layers of a Niclad pot would be only 0.0008 of the original length. This is, of course, so small that the elastic properties of the materials enable them to absorb the expansion strains without causing failure.

Checks Deterioration

When alloy pots are used as lead bath containers the molten lead gradually dissolves and leaches out the chromium and nickel from the pot walls. This deteriorating action progresses slowly until the pot becomes so weakened that it can no longer support the heavy load of lead. Then failure occurs. Niclad pots eliminate this defect by having the non-oxidizing metal on the outside where it is prevented from coming in contact with the lead by the intervening layer of

(*Please turn to page 318*)



A comparison of the thermal conductivity of Niclad with that of a typical alloy used for containers which are subjected to high temperatures. Curve A, Niclad. Curve B, Chrome Steel Alloy (20% Chromium). Niclad has from 3 to 3½ times the thermal conductivity of the alloy.

*Reprinted from "Inco" through the courtesy of The International Nickel Company, Inc.

NEWS *of the* INDUSTRY

Foreign Trade Opportunities

FOREIGN trade opportunities reported by the U. S. Bureau of Foreign and Domestic Commerce during the month of August include inquiries from the following sources: Electrical wiring supplies (39810) from Karachi, India; for wire nails (39813) from Bahia de Caraquez, Ecuador; for barbed wire (39813) from the same inquirer; for galvanized wire (39918) from Nuevitas, Cuba; for plain, galvanized and barbed wire (39852) from Habana, Cuba; for chain link fencing with zinc galvanizing (40020) from Nantes, France; for screw nails (40013) from Helsingfors, Finland; for wire nails (40103) from San Juan, P. R.; for coiled steel springs (40000) from Tegucigalpa, Honduras; for insulated stranded wire for telephones (40161) from Lyon, France; for wire and cable (40163) from Hamburg, Germany; for electric wiring supplies (40203) Aguadilla, P. R.; for electrical wiring supplies (40401) from Bombay, India; for barbed wire (40313) from Barranquilla, Colombia; for paper mill wire (40509) from Oslo, Norway; for wire rope and cable (40443) from Penrith, England.

Third Conference On Wire Rope

INVITATIONS have been issued to over 200 manufacturers and users of wire rope for the Third Wire Rope Conference to be held in New York at 2:00 p. m. on September 13th in the Engineering Societies Building.

This is the third conference on this subject to be held within six months under the auspices of the A. S. M. E. Research Committee with the assistance of Engineering Foundation for the purpose of discussing the desirability of organizing a research committee in the United States to further advance the knowledge of the properties and life of wire rope through a cooperative investigation.

Mossberg Pressed Steel Corporation Doubles Capacity

The Mossberg Pressed Steel Corporation of Attleboro, Mass., has completed a two-story addition to their plant. While the floor area of the plant has not been quite doubled, the new machines and the relief from congestion will at least double production. This company is engaged in the production of reels, spools, special vulcanizing and impregnating reels and vulcanizing pans. It also manufactures a line of pressed steel specialities for the textile industry, and a high-speed braider carrier that enjoys widespread use.

The management states that with the new production schedule in effect, it expects to overtake unfilled orders within a few months.

Personal

Page Steel & Wire Co., Bridgeport, Conn., is transferring its general sales offices to Pittsburgh, Penna., although W. T. Kyle, general manager of sales, will remain at the New York offices, 230 Park Avenue. R. J. Teeple will be in charge of chain link fence sales, S. B. Cairns of field fence and general wire products, and J. J. Flaherty of welding wire and specialities.

Olaf Isachsen, formerly sales manager of the Strand & Sweet Mfg. Co., Winsted, Conn., has resigned to become associated with the Wheeler Wire Co., Bridgeport, Conn.

Dudlo Mfg. Co., Fort Wayne, Indiana, subsidiary of the General Cable Corporation, has appointed Herman Arber general plant superintendent to succeed Wendell C. Glass, who recently resigned. George Kierspe, manager of the coil department at the Dudlo plant in Rome, N. Y., will hereafter act in a similar capacity at Fort Wayne.

Building and Expansion

Sleeper & Hartley, Inc., of Worcester, Mass., have entered into an exclusive agreement with the Strand Enamel Works, of Winsted, Ct., to manufacture and sell the Wire Enameling Machines which were previously marketed by Mr. R. E. Strand. The first lot of these machines is now being built in the Worcester plant of Sleeper & Hartley, Inc., to whom all inquiries for such equipment should be addressed. Mr. R. E. Strand will devote his entire efforts to the manufacture and sale of his enameling materials.

George A. Jacobs, founder and former president of the Dudlo Manufacturing Company, and his associates have organized the Inca Manufacturing Corporation at Fort Wayne, Indiana, to manufacture copper wire products for the electric, radio, automotive and kindred industries. Offices have already been established and construction of a plant is well under way on the eleven acre factory site purchased. It is expected to have the plant in operation with actual production within the next few weeks. Officers of the Inca Manufacturing Corporation are: George A. Jacobs, president; Wendell C. Glass, vice-president; George W. Spindler, secretary-treasurer S. A. Jacobs, in charge of sales.

The home office and plant of the Inca Manufacturing Corporation, now under construction, is located at Fort Wayne. It is planned to establish later

another large factory unit at Los Angeles, California. The first unit of the factory, nearing completion at the present time, covers an area 200 by 300 feet and will afford immediate employment for 500 workers. The company will manufacture all the copper wire products and specialties essential for the needs of the progressive development of automotive, electrical and radio industries, specializing in magnet wire and windings for electrical purposes.

American Wire Cloth Co., Kalamazoo, Michigan, will build and equip additional factory at an estimated cost of about $35,000.

The Steel Co. of Canada, Ltd., Hamilton, Ontario, is planning to erect a plant at Hamilton for the manufacture of galvanized and barbed wire. The company is also planning an addition to its Montreal plant.

Trumbull Electric Mfg. Co., Plainville, Conn., manufacturers of electric switches, etc., is reported to be planning the building and equipment of extensive additions at an approximate cost of $50,000.

Heuser Mfg. Co., 231 W. Illinois Street, Chicago, Ill., manufacturers of screw machine products, has purchased a plant at 1638 North Paulina Street.

Standard Underground Cable Company, Division of General Cable Corporation, announce the discontinuance of their Construction or Cable Installation Department, as of July 1, 1929. Cable installation has been a continuing feature with the Standard for nearly forty years, during which time, however, there has been a gradual building up of installation and maintenance departments by all of the larger cable users. This, together with the service which qualified contractors are prepared to supply, renders no longer so necessary the maintenance by the manufacturer of a service which was for a long time an outstanding essential.

COMING EVENTS

September 9-12. Annual meeting The Institute of Metals (British) at Dusseldorf, Germany. G. Shaw Scott, Secretary, 36 Victoria Street, London, S. W. 1.

September 9-13—National Metal Congress in Cleveland, Ohio. Simultaneous meetings with the American Welding Society; Institute of Metals Division, American Institute of Mining and Metallurgical Engineers; Iron and Steel Division, American Society of Mechanical Engineers; Iron and Steel Division American Institute of Mining and Metalurgical Engineers; and American Society for Steel Treating. W. H. Eisenman, Secretary, 7016 Euclid Ave., Cleveland, Ohio.

September 24-26. Railway Equipment Manufacturers Assn. at Chicago. Secretary, F. W. Venton, 836 S. Michigan Ave., Chicago.

September 9-14. National Assn. of Power Engineers at Chattanooga, Tenn. Secretary, F. W. Raven, 417 S. Dearborn St., Chicago.

September 30-Oct. 4. National Safety Council Congress at Chicago. Secretary, W. H. Cameron, 108 E. Ohio St., Chicago.

October 14-16. National Assn. Manufacturers of the United States at New York. Secretary, J. Lewis Bentor, 11 W. 42nd St., New York.

October 21-26. Railway Electrical Supply Manufacturers' Assn. at Chicago. Secretary, Edward Wray, 9 S. Clinton St., Chicago.

October 15-17. Bridge and Building Supply Men's Assn. at New Orleans. Secretary, I. B. Tanner, 332 S. Michigan Ave., Chicago, Ill.

October 29. World Engineering Congress, Tokio, Japan. George W. Fuller, Chairman American committee on attendance, 170 Broadway, New York City.

December 2-6—Annual meeting of the American Society of Mechanical Engineers at the Engineering Societies Building, 29 W. 39th St., New York City. Calvin W. Rice, secretary, 29 W. 39th St., New York City.

December 2-7. National Exposition of Power and Mechanical Engineering at New York. Address Charles F. Roth, 420 Lexington Ave., New York City.

December 18. International Assn. Municipal Electricians at Boston. Secretary, H. N. Lang, City Hall, Orlando, Fla.

Williamsport Wire Rope Co., Williamsport, Penn., will replace its temporary plant at Sparrows Point, Baltimore, with new buildings and equipment estimated to cost about $90,000.

Lindsay Wire Weaving Co., Cleveland, Ohio, plans to build and equip additional factory at an estimated cost of about $65,000.

General Insulating & Mfg. Co., Alexandria, Indiana, is planning to build and equip additional factory facilities at an estimated cost of about $65,000.

Progress Spring Bed Co., Ltd., 988 Debullion Street, Montreal, Canada, is planning the erection of a five-story factory building.

Anaconda Wire & Cable Co., 25 Broadway, New York, is expanding and equipping a wire mill at Hastings, New York, at an estimated expenditure of a million and a half dollars. Similar extensive developments are in prospect for plants at Sycamore, Illinois; Anderson, Indiana; and Muskego, Wisconsin. Anaconda has also recently purchased Marion Insulated Wire & Rubber Co., Marion, Ohio, manufacturers of rubber covered wire and cables.

Strand & Sweet Manufacturing Co., Winsted, Conn., recently purchased by Polymet Manufacturing Co., is building fifteen new enameling machines to take care of increased demand for enameled wire products.

Beacon Enameled Products Corporation, Lynn, Mass., has been incorporated to manufacture enameled steel wire products with a capital of $100,000. The incorporators are Aaron Kobrin, Swampscott, Mass., and H. S. Starr, Beverly Fitzgerald and Gerald W. Fitzgerald, all of Lynn.

Marlboro Wire Goods Co., Marlboro, Mass., has broken ground for a plant addition to be built at an estimated cost of $45,000.

Receivers for Connecticut Telephone & Electric Company, Meriden, Conn., manufacturers of telephone equipment and electric fixtures, announces that the plant will shortly be offered at public sale.

Sleeper & Hartley
TRADE MARK

Practical Wire Wo

These Machines Go Into Production at ...e—

Continuous Rod Frame

(No. 5—14 or 15 wire)

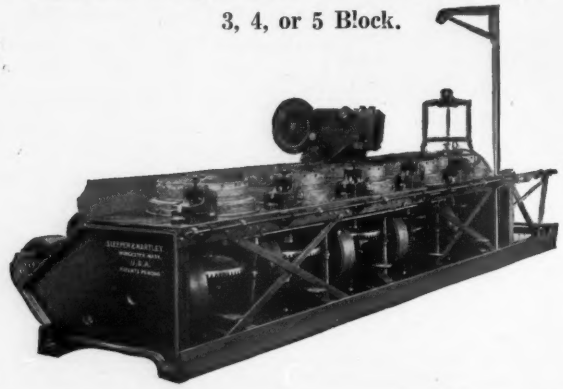
Patented June 3, 1924—May 12, 1925—others pending

All Ball or Roller Bearings

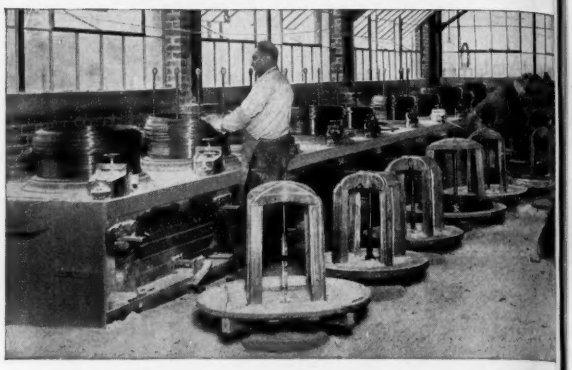
No Differential Gearing.

Automatic Compensation for Speeds of Heads.

3, 4, or 5 Block.



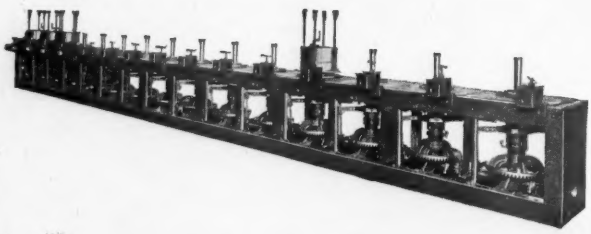
Single Hole Drawing



Standard Rod Frame—10 Block

Long, Stiff Spindles, in anti-friction bearings, and equippe with friction Clutches. Powerful and reliable. Practically noiseless in operation.

(New Plant of Thompson Wire Co., Worcester, Mass.)



Heavy 16" Frame For .65 Carbon Wire No. 10½ to .037"

15 Blocks: Motor driven. Silent chain. Anti friction bearings and cut gears throughout.

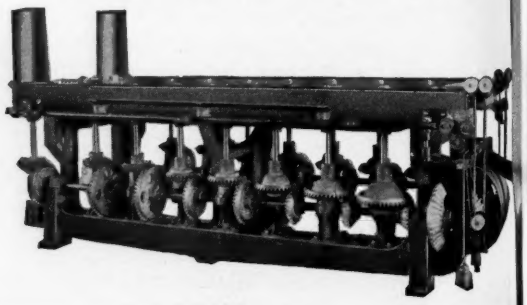
(New Plant of Johnson Steel & Wire Co., Worcester, Mass.)

Double 8-Draft Fine Wire: W...

No. 22 to 36. High or low carbon wire.

6 Blocks to Average Operator, 22-33, 8-hole, 660 lbs. ...ay of ten hours.

Many thousands of these heads in operation



CHICAGO TERRITORY
Neff, Kohlbusch & Bissell, Inc.

SAN FRANCISCO AND LOS ANGELES
L. G. Henes Machinery Company

FOREIGN AGENTS AND REPRESENTATIVES: UNITED KINGDOM—Mr. Fredk. A. Perry, 63 Queen Victoria St., London, E. C. 4.
AUSTRALIA AND NEW ZEALAND—Edwin Wood Pty. Ltd., Melbourne
MONTREAL AND TORONTO—Arthur Jackson Machine Tool Co.
JAPAN—Andrews & George Co., Tokyo

SLEEPER & H...

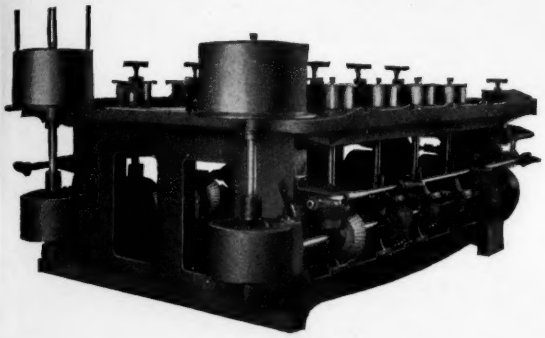
rking Machinery

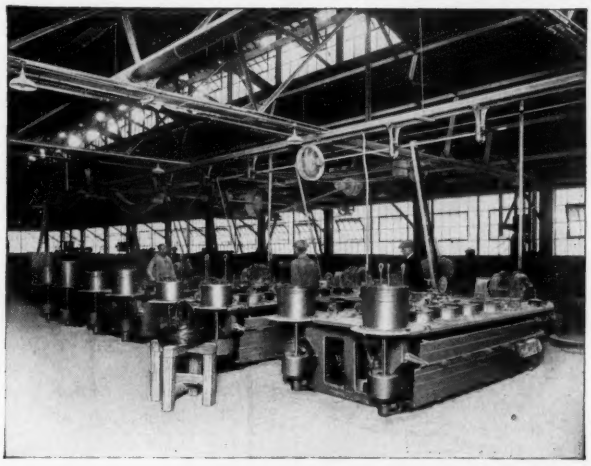
Sleeper & Hartley TRADE MARK

—Reducing Overhead—Increasing Production!!

Double 5-Draft Dry, Intermediate

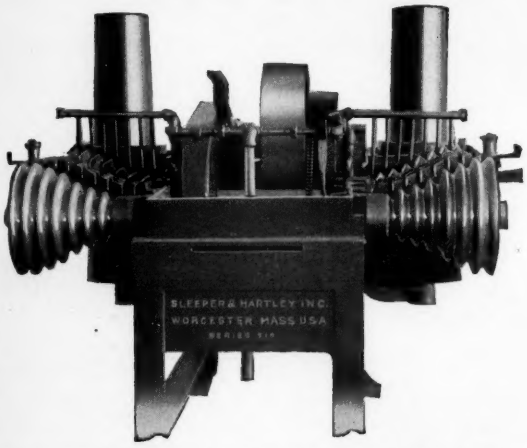
No. 14 to No. 23. High or low carbon wire.
3 to 4 Blocks to Average Operator.
No. 14 to 19—4 hole, 1400 lbs. per block.
No. 14 to 20—5 hole, 1100 lbs. per block.
More than 300 heads of this improved model in operation



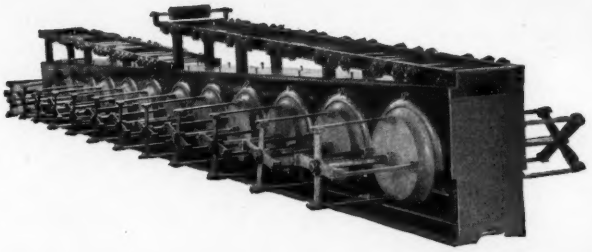


Battery of Double Six-Draft Dry Continuous For High Carbon Wire

Direct driven with silent chain. Cut gears throughout. Anti-friction bearings. Variable speed for finishing block. (New Plant of Thompson Wire Co., Worcester, Mass.)



Improved Double 8-Draft Cone Type Continuous Wet Wire Drawing Machine



Patenting Furnace Take-Up

(New Plant of Thompson Wire Co., Worcester, Mass.)

NEW YORK TERRITORY—Triplex Machine Tool Co.

Philadelphia Territory
Swind Machinery Co.

ARTLEY, Inc., WORCESTER, MASS., U. S. A.

DIGEST *of* RECENT TRADE LITERATURE

Apparatus for Thermomagnetic Analysis. Bureau of Standards Journal of Research, April, 1929. P. 659.

Thermomagnetic analysis consists in the study of magnetic effects occuring in a material during heating or cooling, with special reference to their interpretation in terms of structural changes or transformations. It is most conveniently carried out by means of a magnetometer of suitable type. This paper describes thermomagnetic analysis apparatus set up at the Bureau of Standards, the general arrangement, the magnetometer, coils and furnace, experimental procedure, and typical results.

Torsional Fatigue Tests on Spring Steels. Researches on Springs, No. 3. National Department of Scientific and Industrial Research (Great Britain). H. M. Stationery Office, 1928.

Report of tests devised to disclose actual properties under torsional stress cycles similar to those under working conditions. Variations due to surface blemish, decarburization and other disturbing factors were eliminated. Detail of results reported with full discussion. In general, the values of the safe ranges for reversed and repeated stresses are roughly proportional to the tensile strength of the various materials; the ratios of the safe ranges for reversed stresses to the ultimate tensile strength are about the same as those obtained for normalized steels in the Stromeyer machine. In the case of the mild steel and the normalized 0.6 per cent. carbon steel, the safe ranges are less than 10 per cent. below those for reversed stresses even when the superior limits of stress approaches the ultimate stresses of the materials. In the case of hardened and tempered spring steels there are marked decreases in the safety ranges at the high mean stresses, but the results are still considerably above the modified Goodman values.

High Cost of Unnecessary Accuracy. Machine Shop Practice. January-April, 1929. P. 13.

Mr. Erik Oberg discusses a paper in which Professor James A. Hall outlined the development of measuring devices during the last century. Among other instances, Mr. Oberg cites a case where a screw first estimated at more than $10,000 was produced for $315—an illustration of the excessive cost which unnecessary accuracy may entail in the machine shop field. "These examples", he concludes, "taken from everyday manufacturing practice, will indicate that there is such a thing as unnecessary accuracy being asked for in the machine shop field. The most valuable quality of an engineer outside of his technical knowledge is a sense of values, the ability to judge when and where not the things that are theoretically possible are, in practice, sensible".

Trade Literature Received

Welding Practice

"Oxwelding Aluminum and its Alloys". The Linde Air Products Company, 30 East 42d St., New York City. 8 pages. Illustrated from photographs. A discussion of current practices in oxwelding the commercial grades of aluminum. Photographs show processes in welding technique and illustrate typical applications.

Screw Products

"Heads and Threads". Elco Tool & Screw Corporation, Rockford, Illinois. 12 pages. Illustrated. A non-technical description of the processes involved in the making of Elco wood and machine screws—heading, shaving and slotting, thread cutting, thread rolling, cleaning and washing, and inspecting. Booklet primarily designed for use as a mailing enclosure.

Platinum

"Technical and Industrial Platinum". J. Bishop & Company Platinum Works, Malvern, Penna. 94 pages. Illustrated. A complete handbook of useful and interesting information about the platinum metals (platinum, ruthenium, rhodium, palladium, osmium, and iridium). Includes history and metallurgy standards and specifications for platinum wire and wire products, and contains a table of weight per foot of platinum wire in grammes and troy ounces for B& S guage sizes.

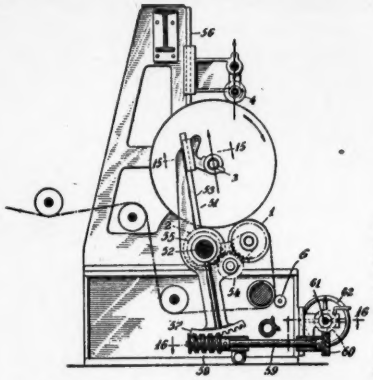
Welding Wire

"Materials Are Important". Page Steel & Wire Company, Bridgeport, Conn. Illustrated pamphlet. Tells briefly why welding wires must be subjected to special "processing" in order to produce good welds and explains the importance of making welding wire from the highest grade of iron and steel. Standard sizes of welding wire are given and recommendations are made for the particular type of wire to use for various welding jobs such as structural shapes, bars, pipe, rail ends, etc.

Nitriding

"Nitralloy and the Nitriding Process". Ludlum Steel Co., Watervliet, N. Y. 32 pages. Complete description, illustrated from photographs and diagrams of the process by which special steels can be surface hardened at a low temperature by the action of ammonia and of Nitralloy steels of special analyses for use in the nitriding process. In the latter, by the way, the parts to be hardened are separated in the gas furnace by nickel-wire screening.

A REVIEW *of* RECENT PATENTS



Winding Machine 1,719,830

No. 1,719,830, WINDING MACHINE. Patented July 9, 1929 by James A. Cameron, of Brooklyn, New York, assignor to Cameron Machine Company, of Brooklyn, New York. This invention relates to winding machines of the type known as surface winding machines, and the main object and feature of this invention is to counteract the tendency of the winding shaft, and its accumulated material, to roll or bounce out of the machine, when the shaft is being revolved rapidly. The device is designed to handle flexible material such as wire netting, screening, etc.

No. 1,721,184, WIRE DRAWING MECHANISM. Patented July 16, 1929 by Carl F. Mead, of Cleveland, Ohio. The patent is granted on improvements comprising a readily releasable clamping means for the free end of the wire, improvements of the wire holding rods or hooks upon which the wire is collected after it leaves the drum, and improvements to the mechanism for removing the finished wire coil from the drum, all based upon the patentee's prior U. S. Patent No. 1,682,393, of August 28, 1928.

No. 1,722,421, WIRE DRAWING MACHINE. Patented July 30, 1929 by William Fuller Hosford, of Oak Park, Illinois, assignor to Western Electric Company, Inc., of New York, New York. Among the objects of the invention is to provide mechanism so designed that the operation of stringing the machine with wire is facilitated. To this end the improved machine includes a series of sheaves all of the same diameter, which are each free to rotate on a common horizontal shaft which is mounted above and in substantially the same vertical plane with a second horizontal shaft upon which a conical capstan is supported, a series of dies being mounted between the sheaves and the capstan. The diameter of each sheave is less than the largest diameter of the capstan.

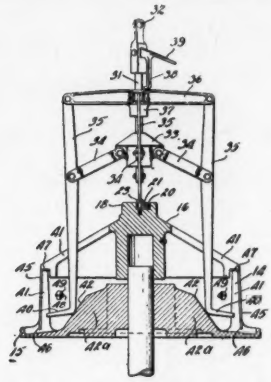
Complete descriptions and drawings of any of the patents referred to on this page may be had for twenty five cents. Address orders to Wire & Wire Products, 551 Fifth Avenue, New York City.

No. 1,722,584, RESILIENT BOTTOM FOR COUCHES, CHAIRS, etc. Patented July 30, 1929 by Jacob Kronheim, of Cleveland, Ohio. The inventor, in connection with his U. S. Patent No. 664,934, provides a spring bottom element which is constructed of cloth coiled wire spring, wire tension springs and wire connectors, and assembled as a separate unit in the shop and which may be manufactured and sold as a separate article, to be installed by furniture manufacturers in upholstered furniture frames of standard sizes.

No. 1,719,894, METHOD AND APPARATUS FOR WIRING COIL SPRINGS. Patented July 9, 1929 by Arthur J. Lewis and Warren S. Reynolds, of Stratford, Connecticut, assignors to John Chatillon & Sons, of New York, New York. According to this invention, wire coil springs, such as are used in tire pressure gauges, scales, etc., are passed to a work support, where a wire is automatically bound around the ends of the spring in such manner that accidental removal of the binding wire is prevented and so that each spring is uniformly bound. After the wire has been applied, the work support is moved out of the way when the wired spring falls into a bin beneath.

No. 1,722,362, METHOD OF WINDING COILS. Patented July 30, 1929 by Schuyler Colfax Wiley, of La Grange, Illinois, assignor to Western Electric Company, Inc., of New York, New York. In order to lessen the possibility of deleterious short circuits in electrical coils, the inventor provides a method consisting in electrically connecting an uninsulated lead-in wire to an end of a supply of winding material, passing the end of the lead-in wire through a spool head, super-imposing a plurality of layers of winding material upon the lead-in wire and upon each other adjacent to the spool head, and then starting the winding of the first layer of the coil.

No. 1,717,243, APPARATUS FOR WINDING ELECTRIC CONDENSERS. (Patented June 11, 1929) by George Nauk, of Berlin, Germany, assignor to General Electric Company, New York. An object of the invention is to provide a device for winding condensers in which the elements of the condenser while being wound are caused to pass against a device for forcing off the air from the condenser elements.



Wire Drawing Mechanism 1,721,184

No. 1,720,746, SUPPORT FOR WIRES. Patented July 16, 1929 by Paul K. Povlsen and Everett St. John of Brooklyn, New York, assignors to American Telephone and Telegraph Company, New York. This invention relates to supports for wires, and more particularly to supports for wires at the points where they enter cable terminals. The support is constructed of a single piece of wire bent to form a plurality of arms arranged in angular relation to each other, rings formed in the single wire at the junction points thereof with the planes of said rings at right angles to each other, and attaching means associated with two arms of the support whereby it may be secured to and suspended from a cable terminal to hold the wires extending therefrom in retained position within the rings.

No. 1,721,157, WIRE WINDING DEVICE. Patented July 16, 1929 by Nelson L. Kuhlmann, of Kerrville, Texas. Particularly, this device is designed to attach the small splints of wood, such as are used by florists, to the stems of flowers. Such attachment is done by winding both with wire.

No. 1,720,676, STRAND WORKING MECHANISM. Patented July 16, 1929 by William Fuller Hosford, of Oak Park, and David Levinger, of Chicago, Illinois, assignors to Western Electric Company, Inc., of New York, New York. In accordance with the general features of the invention a wire drawing mechanism is provided with a common supporting surface and a single operative connection for associating interchangeably in supporting and driving relationship therewith, either a wire coil take-up mechanism formed as a unit, attachable to the wire drawing mechanism and detachable therefrom, or a spool take-up mechanism also formed as a unit, attachable to the wire drawing mechanism and detachable therefrom.

Color Identifications Recommended For Marking Metals

Industries may now adopt a practical system that has been used by the Navy for fifteen years

ACCORDING to an announcement recently made public by the Federal Standard Stock Catalog Board, Federal Coordinating Service, the following color designations will be used in marking the ends of metals (bar, billet, ingot and slab) for convenience in identifying. These colors have been used with complete satisfaction by the Navy for about fifteen years and presumably will be adopted by all departments and establishments of the government after the issuance of the sheet of the Federal Standard Stock Catalog. It is expected that this method of identification, which represents a progressive step in the simplification and standardization program of the government, may be found applicable by industrial users of metals or serve as a basis for a similar program.

Black (solid)—Copper, hard-drawn.

Black, with brown stripe—Steel, corrosion-resisting.

Black, with green stripe—Steel (SAE 1035), heat-treated.

Black, with lead stripe—Steel, Class-A, bolt-material.

Black, with pink stripe—Steel (SAE 1035), semi-finished.

Black, with white stripe—Copper-nickel alloy.

Black, with yellow stripe—Manganese-nickel.

Blue (solid)—Bronze, rivet, medium.

Blue, with black stripe—Bronze, journal.

Brown (solid)—Steel, medium.

Brown, with black stripe—Steel, Class-B, cold-rolled.

Brown, with blue stripe—Nickel (SAE 2325).

Brown, with green stripe—Steel, carbon (SAE 1035).

Brown, with lead stripe—Steel, carbon (SAE 1020).

Brown, with red stripe—Steel, carbon (SAE 1025).

Brown, with pink stripe—Steel, chrome-vanadium (SAE 6130).

Brown, with white stripe—Steel, carbon (SAE 1095).

Brown, with yellow stripe—Steel, nickel (SAE 2330).

Green (solid)—Steel, tool, carbon, Class-1.

Green, with black stripe—Steel, tool, carbon, Class-2.

Green, with blue stripe—Steel, tool, carbon, Class-3.

Green, with brown stripe—Steel, tool, carbon, Class-4.

Green, with lead stripe—Steel, tool, tungsten, Class-1.

Green, with pink stripe—Steel, tool, tungsten, Class-2.

Green, with red stripe—Steel, tool, carbon, Class-5.

Green, with white stripe—Steel, tool, carbon, Class-1, drill-rod.

Green, with yellow stripe—Steel, tool, tungsten, Class-1, drill-rod.

Lead, (solid)—Aluminum.

Lead, with black stripe—Aluminum-alloy.

Pink (solid)—Brass, Naval, rolled.

Pink, with black stripe—Brass, commercial.

Pink, with lead stripe—Steel, chrome-vanadium (SAE 6145)

Pink, with red stripe—Steel, Grade-P, semi-finished.

Pink, with white stripe—Steel, Grade-V, semi-finished.

Red, (solid)—Steel, rivet, medium.

Red, with yellow stripe—Steel, rivet, Class-B.

Red, with green stripe—Steel, spring.

Red, with white stripe—Steel, rivet, high-tensile.

White (solid)—Iron, wrought.

White, with black stripe—Steel, Class-Ac, heated-treated.

White, with brown stripe—Steel, Class-An, heat-treated.

White, with green stripe—Steel, Grade T, semi-finished.

White, with lead stripe—Steel, Class-B, heat-treated.

White, with pink stripe—Steel, Grade N, semi-finished.

White, with red stripe—Steel, Class HG, heat-treated.

White, with yellow stripe—Steel, Grade W, semi-finished.

Yellow (solid)—Steel, machinery, cold-rolled.

Yellow, with black stripe—Steel, Grade R, semi-finished.

Yellow, with blue stripe—Steel, Class B-s (special), heat-treated.

Yellow, with brown stripe—Steel, Class-C, heat-treated.

Yellow, with green stripe—Steel, Class-C, semi-finished.

Yellow, with lead stripe—Steel, Class-S, semi-finished.

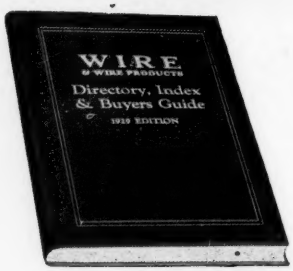
Yellow, with pink stripe—Steel, Class-B, bolt-material.

Yellow, with red stripe—Iron, cast.

Yellow, with white stripe—Steel, Class-A, cold-rolled.

Note 1. The information below relative to color-designations is issued in advance of the publication of detailed data for Class 46.

Note 2. BARS: The bars included in this class are limited, with referenced to shape, to flat (square-edge), hexagon, octagon, round and square. Bars of other shapes are classed as "shapes" and are covered by Class 48.



¶ Below is a typical listing from the 1929 Directory

MACHINERY: WIRE DRAWING

AMERICAN INSULATING MACHY. CO., Philadelphia, Pa.
Bates Mfg. Co., Joliet, Ill.
BERNITZ, J. I., 25 Beaver, NYC
Blake & Johnson Co., Waterbury, Conn.
Bliss, E. W., Co., Brooklyn, N. Y.
Broden Construction Co., Cleveland, Ohio
Brown Engine & Machine Co., Fitchburg, Mass.
Burlingame Machine Co., Worcester, Mass.
Farnham Mfg. Co., Buffalo, N. Y.
General Engineering & Supply Co., 160 5th Av., NYC
Humphrey & Sons, Joliet, Ill.
Leiman Bros., 23 Walker, NYC
Mackenzie's, Duncan, Sons Co., Inc., Trenton, N. J.
MORGAN CONSTRUCTION CO., Worcester, Mass.
NATIONAL-HARRIS WIRE CO., Newark, N.J.
New England Wire Machy. Co., New Haven, Conn.
Richard Mfg. Co., Bloomsburg, Pa.
SLEEPER & HARTLEY, Inc., Worcester, Mass.
Somerville, Wm. E., & Co., Coal City, Ill.
Standard Machinery Co., Auburn, R. I.
Superior Tool & Mfg. Co., Worcester, Mass.
TORRINGTON MFG. CO., Torrington, Conn.
Treadwell Engineering Co., Easton, Pa.
Universal Hoisting Machy. Corp., Buffalo, N. Y.
Universal Wire Machy. Co., New Haven, Conn.
Vaughn Machinery Co., Cuyahoga Falls, Ohio
Waterbury Farrel Fdry. & Mach. Co., Waterbury, Conn.

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Ove eight hundred classifications, alphabetically arranged, cover everything used in the making and forming of all kinds of wire. The listings range from Abrasives to Zinc Wire.

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The book is a handy size for reference, 6¼x9¼ inches, printed in clear type on heavy paper, bound in stiff boards and covered with dark cloth that will withstand the wear and tear of shop use without getting soiled. Use the coupon below for convenience in ordering.

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LOADING LAGGED
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and
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SHIPPING REELS MACHINE
for the Wire & Cable Industry
*Patented

Domestic Exports and Imports of Iron and Steel Wire and Wire Products

Exports of iron and steel wire and wire products from the United States in April and May, 1929
(In gross tons)

Item	June 1929	May 1929	June 1928	January through June 1929	January through June 1928
Wire rods	2,774	3,197	4,818	23,060	18,529
Plain wire	3,789	3,518	4,657	26,137	23,672
Barbed wire and woven wire fencing	6,395	5,409	7,000	35,688	38,426
Wire cloth and screening	150	142	169	912	849
Wire rope	738	505	430	3,922	2,578
Insulated wire and cable	45	115	36	594	288
Other wire and manufactures of	1,017	961	789	5,791	4,404
Wire nails	952	513	1,300	7,958	8,607
Nails other than wire	868	482	1,045	5,006	4,857
Tacks	60	55	46	343	404

Imports

Imports of iron and steel wire and wire products into the United States
(In gross tons)

Item	June 1929	May 1929	June 1928	January through June 1929	January through June 1928
Wire rods	1,336	2,778	1,119	8,596	9,417
Barbed wire	612	360	183	2,965	1,749
Round iron and steel wire	295	467	344	3,266	2,032
Steel telegraph and telephone wire	....	....	25	....	143
Flat wire and strip steel	162	346	134	1,103	1,207
Wire rope and strand	256	206	184	1,264	803
Other wire	85	77	1	349	278
Nails, tacks, and staples	1,079	1,099	688	4,540	3,843

Preliminary figures for United States electrical wire and wire product exports
(In dollars)

Article	June		6 months ended June 30	
	1928	1929	1928	1929
Insulated wire and cable, iron or steel	$ 18,083	$ 19,174	$115,146	$218,718
Copper, bare wire	183,325	233,828	1,148,745	1,871,252
Copper, insulated wire and cable	484,206	538,290	2,311,459	3,392,393
Insulating material	111,779	116,486	649,029	684,653
Other wiring supplies and line material	67,386	153,487	468,155	692,253

CARD clothing, for the first time in four months, showed increased imports, the June figure being 22,494 square feet, valued at $36,366, against 15,151 square feet, valued at $32,144 in May. Almost the entire importation was from the United Kingdom, with relatively small quantities coming in from Switzerland, France, and Germany.

Imports of wire cloth and screening increased to 67,579 square feet from 40,131 square feet in May. Of the June total Germany supplied 49,532 square feet, France 10,243 square feet, and Canada 7,742 square feet.

The trade in wire heddles also gained, 4,235,000 pieces being received in June, against 4,032,000 in May. France, with 2,468,000 pieces, was the principal source of supply; Germany sent 1,008,000 pieces, Switzerland 519,000 pieces, and Belgium 240,000 pieces.

Wood-screw imports recovered from the low figure of May (3,653 gross, valued at $582) to total 46,015 gross, valued at $8,597. Sweden supplied 44,983 gross, Germany 517 gross, the United Kingdom 500 gross, and Denmark 15 gross.

WIRE DRAWING DIAMOND DIES

Over 30 years experience in this line. The best equipped establishment in America with modern methods and machinery.

New way for re-inforcing the diamond.

(U. S. Patent 1,624,027. April 12, 1927.)
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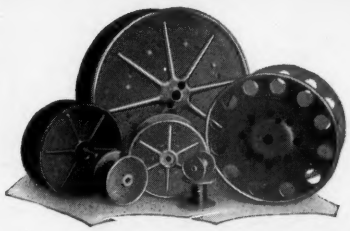

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The following advantages are claimed by the manufacturer. Comparing the operation of their machine to the old meth-

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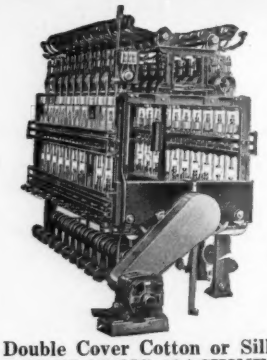

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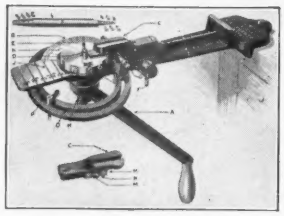

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od of hand nailing: 1. Saves 50% to 75% of labor now expended in hand nailing. 2. The user can guarantee that all Staples are **in the head**—the driver being set permanently to inject Staples in the correct level relative to the top of the head. 3. Makes it unnecessary to use head liners. 4. Provides an easier and quicker way to open barrels—as staples can be readily removed by use of pliers or long handled screw driver. It follows that consignee can obtain maximum salvage value from barrel or keg, as head is quickly removed without damage.

use of pliers or long handled screw driver. It follows that consignee can obtain maximum salvage value from barrel or without damage.

Only Two Moving Parts

The manufacturers have tried to make this machine as simple as possible. There are only fifteen parts, outside of screws and bolts—and only two moving parts, the operating lever and the driver. It, therefore, follows that there is only minimum chance for wear, breakage and replacement of parts. The Staple used is made of number eleven gauge steel wire, with flat top and nail points. The inside dimensions are three-quarter inch wide by one inch long. It is driven flush with the hoop, both prongs into the head the same depth. For this reason it is necessary to use only one-half the number of Staples as nails. It is possible for an operator to stand in one position while driving.

An ingenious method is used for loading. The magazine of the machine is clearly shown in the illustration—in a nearly vertical position. This is opened by swinging back the cover, using the short lever shown at the top. The Staples are cemented together in blocks of 25 pieces each. Four blocks can be very quickly placed in the magazine. This is a full load and, for most purposes, is sufficient for stapling heads in 25 barrels or 50 kegs. Staples cannot be lost or

wasted as they are fed into operation automatically.

Many large users of barrels and kegs have already greeted the introduction of this machine with enthusiasm and a number of machines are already being tried out in shipping and packing rooms. It is understood that several sales agencies have been selected by the Titchener Company in the large centers and are ready to give demonstrations, without obligation, to interested parties.

Wire Cloth For Paper Making

(*Continued from page 297*)

drying by means of suction boxes which draw off the water through the oblong spaces in the mesh. The oblong shape; that is, with the long side in the direction of the warp, drains easily whereas a square would hold the water.

Friction is the great foe to the life of paper making wires, a condition which is unavoidable but which can be minimized by care and watchfulness. The knuckles on the wire cloth cause erosions on the covers of the suction boxes. These erosions, in the form of ridges, react on the threads of the wire—so much so that under a microscope one may see parallel ridges and depressions on the threads. Naturally this weakens the wire and it soon breaks.

In an effort to minimize friction several designs have been introduced other than plain mesh. One, called the long crimp, is woven by passing the thread under two wires instead of one, with the result that the cloth presents a smoother surface. There is also a triple warp wire. In this case three warp wires are wound together instead of one.

The placing of a wire on the machine requires great care as the least indentation may mean a serious break later. Most of the movable parts of the machine are taken down, including

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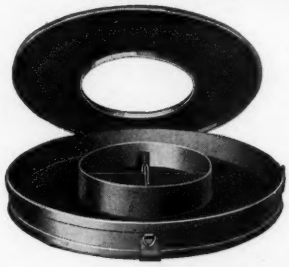

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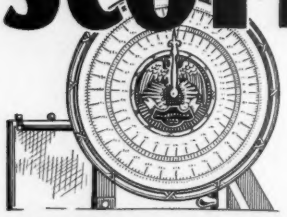

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the rollers and suction boxes, and the covers of the latter are planed down to remove any erosion that may have been caused by the action of the discarded wire.

In mills making heavy papers, wire cloth is also used on a Cylinder machine. The surface of the cylinders is covered with wire cloth of two distinct meshes. The one next to the body of the cylinder is called the backing and is of a coarse mesh, usually 14 to the square inch. Next to it is a wire of greater fineness, depending on the quality of the paper required. As the cylinder revolves a vacuum dryer in its center drains the water from the pulp on the wire. These wires do not require either a sewn or soldered seam because they are nailed directly to the surface of the cylinders.

Nickel Clad Steel Eliminates Costly Pot Failures

(*Continued from page 303*)

steel. Lead and steel do not alloy at any temperature, though there is found to be an inconsequential migrating or diffusing of microscopic globules of lead into the steel if the two metals are kept in contact at high temperatures for long periods of time.

After 3,000 hours of operation in a lead bath furnace, a Niclad pot was removed from service and sections were cut from the wall of the pot for analysis. One laboratory reported no lead presence and the other only a trace.

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ing processes, it is necessary that a large amount of heat pass from the furnace into the bath. This makes it essential that the thermal conductivity of the pot be high. A great many of the pure metals have excellent thermal conductivities, but practically all alloys are very poor in this respect. Niclad pots in combining two relatively pure metals of high thermal conductivity in intimate contact do not have the low heat transfer of alloy pots.

Lighter Pots Desirable

Due to the strength and ductility of the metals used, a relatively thin wall is sufficient, as there is no danger of failure by cracking. It is therefore unnecessary to use alloy pots with wall thicknesses of from ⅝ to 1¼ inches involving temperature losses of from 75 to 200 degrees when a ½ inch Niclad pot, with practically negligible drop of temperature, will do the work quicker and more efficiently. Good thermal conductivity is further emphasized as an important factor when one considers that in many cases the upper 100 degrees of temperature in the bath is very difficult to secure. This is especially true of electric furnaces in which the heating elements operate at temperatures very near to the burning out point. In such cases, the loss of something in the neighborhood of 100 degrees of temperature by transmission through a poorly conducting pot wall causes frequent failures of the heating elements, and the expense and delay accompanying their renewal.

Not only are the inner and outer layers of material which go to make up Niclad pots tough and ductile, but at the same time, they combine to give an over-all tensile strength sufficiently high to permit using a fairly light pot. This ductility and toughness eliminate the danger of recrystallization and cracking from repeated heating and cooling and furnish the necessary flexibility to take care of the warping and settling of the furnace.

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Patent Decisions Affect Wire Formers

(*Continued from page 300*)

the temperature of the remaining portions of the furnace to quickly bring the submarine cable being passed through the furnace to the desired temperature, constituted an obvious expedient and one devoid of invention, the Board of Appeals affirmed the Examiner's rejection of several claims.

Treats Metallic Tape

The claims are drawn to an apparatus used for heat treating or annealing the spirally-wrapped thin metallic tape constituting the covering of a submarine cable, and to the method practiced in the use of the apparatus. The cable is fed from a reel through an electric furnace at such rate as to subject it to the desired temperature for the proper length of time to effect the desired changes and is then conducted through an elongated cooling chamber to a take-up reel. The two reels are driven from an electric motor, the take-up reel being drawn at a slightly faster rate than the other reel and the driving mechanism for the take-up reel being constructed to slip before such force can be applied to the heated cable by the take-up reel as will cause the cable to become elongated or distorted.

The take-up reel, however, does serve the function of taking up any slack that might otherwise be present in the cable and preventing the cable from kinking or becoming distorted due to such slack. The furnace has a heating chamber which is heated well above 850 degrees to 900 degrees C. in which the cable is initially received. This high temperature rapidly brings the cable up to the desired temperature. The remaining portion of the furnace is maintained at a somewhat lower temperature but sufficiently high to maintain the desired annealing temperature.

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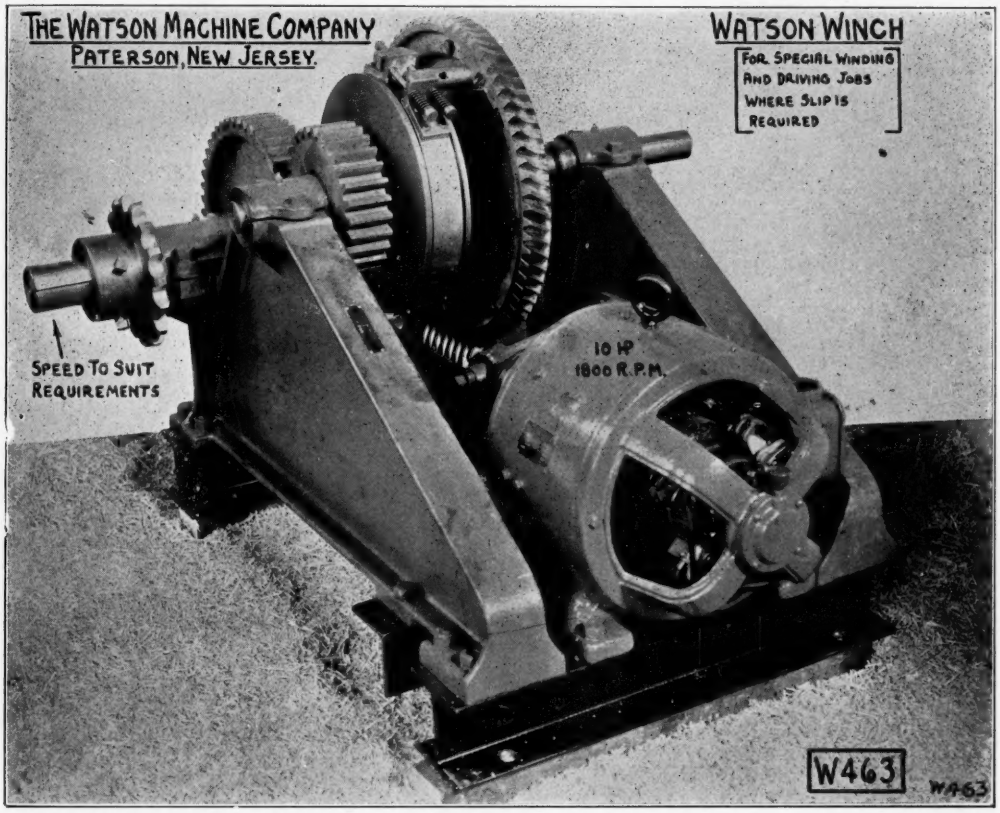

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